Disparities in operative outcomes in patients with comorbid mental illness

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ABSTRACT

Background. Patients with mental health disorders have worse medical outcomes and experience excess mortality compared with those without a mental health comorbidity. This study aimed to evaluate the relationship between mental health comorbidities and surgical outcomes.

Methods. This retrospective cohort study used the National Inpatient Sample (2009–2011) to select patients who underwent one of the 4 most common general surgery procedures (cholecystectomy and common duct exploration, colorectal resection, excision and lysis of peritoneal adhesions, and appendectomy). Patients with a concurrent mental health diagnosis were identified. Multivariable logistic regression examined outcomes, including prolonged length of stay, in-hospital mortality, and postoperative complications.

Results. Of the 579,851 patients included, 38,702 patients (6.7%) had a mental health diagnosis. Mood disorders were most prevalent (58.7%), followed by substance abuse (23.8%). After adjustment for confounders, including sex, race, number of comorbidities, admission status, open operations, insurance, and income quartile, we found that having a mental health diagnosis conferred a 40% greater odds of including prolonged length of stay (OR 1.41, P < 0.001) and increased odds of any complication (OR 1.18, P < 0.001). Odds of death were slightly less in the mental health diagnosis cohort.

Conclusions. General surgery patients with comorbid mental disease experience a greater incidence of postoperative complications and longer hospitalizations. Recognizing these disparate outcomes is the first step in understanding how to optimize care for this frequently marginalized population.

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Introduction

It is estimated that almost half of Americans will meet diagnostic criteria for a mental health disorder at some point in their life, and nearly 1 in 8 will be diagnosed with 2 or more mental health disorders. Patients with a mental health diagnosis are at an increased risk of developing medical comorbidities such as coronary artery disease and lifestyle-related cancers such as lung cancer.

Patients with comorbid mental disease have worse outcomes when treated for medical conditions. Patients with mental health disorders experience worse oncologic outcomes, inferior chronic disease management, and even excess mortality compared with patients without a mental health diagnosis. To date, there is a paucity of literature examining the impact of mental health diagnoses as patients recover from surgery.

The primary aim of this study was to evaluate the relationship between mental health comorbidities and operative outcomes. We hypothesized that patients with mental health comorbidities experience worse surgical outcomes compared with those without a mental health diagnosis.

Materials and Methods

Data sources and patient population

We conducted a retrospective cohort study using the 2009–2011 National Inpatient Sample database. All patients aged 18–90 who underwent one of 4 most common general surgery procedures (cholecystectomy and common duct exploration, colorectal resection, excision and lysis of peritoneal adhesions, and appendectomy) were included as identified by the Healthcare Cost and Utilization Project (HCUP) of the Agency for Healthcare Research and Quality (AHRQ). Procedure categories were defined by the HCUP Clinical Classifications Software, which groups procedures into mutually exclusive categories.
Predictor and outcome variables

Patients were classified as having a mental health diagnosis if they had a Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition diagnosis indicated in their patient claim record. Diagnoses were grouped into categories including anxiety, mood, and impulse-control disorders; substance abuse; and schizophrenia (Appendix B).11

Age, sex, race, procedure type, operative approach, admission status, number of non–mental health comorbidities (Elixhauser classification),12 insurance type, income quartile by zip code, and hospital characteristics were abstracted from the dataset. Operative type was divided into cholecystectomy and common duct exploration, colorectal resection, excision and lysis of peritoneal adhesions, and appendectomy, as described earlier. Operative approach was classified as either open or laparoscopic using ICD-9 procedure codes. Admission status was treated as a binary variable based on classification as an urgent or emergent vs. elective admission. Hospital characteristics included size, ownership, and teaching status and location of the hospital.

The primary outcomes of interest were length of stay (LOS), inhospital mortality, and any complication. LOS was both treated as a continuous variable and converted to the binary variable prolonged LOS (pLOS). pLOS was defined as LOS greater than the 75th percentile for each procedure type and operative approach. Individual complications as identified by ICD-9 diagnosis codes were secondary outcomes (Appendix C).

Statistical analysis

Descriptive statistics were used to compare patients with and without a comorbid mental health disorder. Median LOS was calculated for each group. Univariate analysis was performed to compare the characteristics of the two cohorts. Factors found to be associated with the outcomes on univariate analysis (P value < .1) were included in independent multivariable logistic regression models for each outcome. Because we studied a large number of outcomes, Bonferroni correction was used to evaluate statistical significance. Subset analyses based on type of mental health disease and number of mental health diagnoses were performed for each primary outcome variable.

Stata 13.0/IC statistical software (Stata Corp, College Station, TX) was used for all analyses. This study was deemed exempt from review by the University of Pennsylvania Institutional Review Board.

Results

We identified 579,851 patients who underwent one of the 4 most common general surgery procedures in the United States between 2009 and 2011. Cholecystectomy and bile duct exploration represented 40.7% of the cohort (n = 236,193), followed by colorectal resection (28.7%; n = 166,244), appendectomy (21.4%; n = 124,317), and excision and lysis of peritoneal adhesions (9.2%; n = 53,097). Of the 579,851 patients, 38,702 (6.67%) had a concurrent mental health diagnosis. pLOS was defined as LOS greater than the 75th percentile for each procedure type and operative approach. Individual complications as identified by ICD-9 diagnosis codes were secondary outcomes (Appendix C).

Patients with mental health diagnoses were notably different from patients without a mental health diagnosis (Table 1). Patients with a mental health disorder were more likely to have a mental health diagnosis (73.9% vs. 70.1%, P <.001), and somewhat less likely to have a laparoscopic procedure (60.2% vs. 63.8%, P <.001). Patients with a mental health comorbidity were more likely to be insured by either Medicare or Medicaid (53.2% vs. 43.4%, P <.001) and were more likely to come from the lowest income quartile by zip code (27.8% vs. 24.9%, P <.001).

LOS for patients with comorbid mental illness was 0.8 days greater than patients without a mental health diagnosis (P <.001). On univariate analysis, patients with a comorbid mental health diagnosis had greater rates of both pLOS (29.8% vs. 21.7%, P <.001) and operative complications (39.6% vs. 32.1%, P <.001). There were also significant differences in rates of individual complications (Table 2).

After adjustment for potential confounders (Appendix D), we found that having a mental health diagnosis conferred 40% greater odds of pLOS (OR 1.40, P <.001) and increased odds of experiencing any complication (OR 1.19, P <.001) compared with patients without a mental health diagnosis. Additionally, patients with a mental health diagnosis had increased odds of specific complications including wound disruption, need for percutaneous abdominal drainage, ileus, small bowel obstruction, abdominal pain, need for total parenteral nutrition, respiratory failure, and acute renal failure (Table 3). In contrast, after adjustment for potential observed confounders, odds of in-hospital mortality were slightly less in the mental health diagnosis cohort (OR 0.89, P =.047).

Subgroup analysis revealed that different mental health diagnoses confer different levels of risk for adverse events. Compared with patients without a mental health diagnosis, patients with schizophrenia and substance abuse had a 70% increased odds of pLOS (Table 4). Patients with mood and anxiety disorders had significantly decreased odds of in-hospital mortality. All mental health diagnoses except for impulse-control disorders had increased odds of a complication, with 40% increased odds seen in patients with substance abuse. The number of mental health diagnoses appeared to have a dose–effect relationship with the odds of experiencing pLOS or any complication and no relationship with in-hospital mortality (Table 4).

Discussion

This study shows that for patients undergoing common general surgery procedures, the presence of a mental health diagnosis is associated with significantly prolonged postoperative hospital stays and increased odds of postoperative complications. The type of mental health comorbidity and absolute number of mental health comorbidities affects the odds of experiencing an adverse event. Patients with schizophrenia, substance abuse, and 3 or more mental health diagnoses experienced the greatest increased odds of pLOS and any complication in our study. The presence of a mental health comorbidity did not increase odds of in-hospital mortality, and patients with mood or anxiety disorders had significantly decreased odds of death during their index admission.

Although there is little peer-reviewed literature to date examining postoperative outcomes of general surgery patients with comorbid mental health disorders, our findings support medical studies that have found greater rates of adverse events in patients with mental health disorders. Daumit et al showed that patients with schizophrenia had a greater adjusted odds of adverse events during both medical and surgical admissions.13 A systematic review by Felker et al highlights numerous studies that show consistently that patients with psychiatric illness have greater mortality rates than patients without a mental health diagnosis.6,14 Li et al demonstrated that Medicare patients with a mental health diagnosis by International Classification of Diseases, Ninth Revision (ICD-9) procedure codes (Appendix A).10

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